ABSTRACT

A particle beam image detector employing gas amplification attained by pixel-type electrodes has high sensitivity and improved reliability of electrodes.

Electrons e^- produced through ionization of the gas by the incident particle beams drift under the force of a drift field toward a pixel that is encountered on the way to the surface of the detector, the pixel serving as an anode electrode (12). In the vicinity of the columnar anode electrode (12), by virtue of the presence of a strong electric field formed by a voltage between anode and cathode (e.g., 420 V) and the pointed shape of electrode, gas avalanche amplification of electrons occurs. The + ions thus generated quickly drift toward strip-shaped cathode electrodes (14) around the ions. In the course of this process, electric charges are generated on the columnar anode electrodes (12) and also on the strip-shaped cathodes (14), and these electric charges are observable on the electric circuit. Therefore, observation to determine the anode or cathode strip at which this amplification phenomenon occurs provides information about the position of the incident particle beam.